Ice Seasonality Investigation

Annual Summary Guide

Task

To document the important meteorological milestones which precede the freeze-up and break-up of the Ice Seasonality observation site.

What You Need

- ❒ Pencil or Pen
- ❒ Daily meteorological data
- ❒ *Ice Seasonality Investigation Annual Summary Data Sheet*

If you are using a GLOBE Atmosphere site:

- ❒ Pencil or pen
- ❒ Field note book/paper
- ❒ *Max, Min and Current Temperature Protocol Field Guide*
- ❒ *Solid Precipitation Protocol Field Guide*

In the Classroom

1. Make observations to determine the dates of the appearance and disappearance of ice and snow at the Ice Seasonality observation site and complete the *Annual Summary Data Sheet.*

> *Freeze-Up*: The onset of winter is usually characterized by several below/above freezing temperature episodes. In teh Freeze-Up section on the *Annual Summary Data Sheet* there is a place to record the first occurrence of < 0°C as the daily maximum, mean and minimum air temperature (solid blue boxes in Table 1).
>
> There is also a place to record the first day of (near) **continuous** < 0°C temperatures in each category (open blue boxes). Note that in some instances, the first day of < 0°C and first day of continuous < 0°C may be the same day (i.e., mean temperature at right).
>
> Please note that the 100% ice cover refers to a total ice cover that lasts for the entire season. It may be possible that the ice cover reaches 100% ice cover that then melts back during a few days of warmer temperatures or a rain episode.
>
> *Break-Up*: The onset of spring can be characterized by several above/below freezing temperature episodes. In the Break-Up section on the *Annual Summary Data Sheet* there is a place to record the first occurrence of > 0°C as the daily maximum, mean and minimum air temperature (uppermost open red boxes (~ 3/31/08) in Table 2).

Table 1. Temperature data from the Healy airstrip (PAHV) for autumn 2007.

http://www.wunderground.com/

Healy - PAHV Airstrip Weather Data

AKDT	Temperature (°C)			Precip.
	Max	Mean	Min	Events
09/15/07	6.7	5.6	3.9	Rain
09/16/07	5.6	4.4	2.8	Rain
09/17/07	10.6	6.1	-1.1	
09/18/07	10.0	5.6	1.7	
09/19/07	8.9	6.7	3.9	
09/20/07	10.6	7.8	5.6	
09/21/07	2.8	2.2	1.7	Rain
09/22/07	5.0	0.0	-4.4	Fog
09/23/07	10.6	7.2	3.9	
09/24/07	5.6	0.6	-4.4	
09/25/07	1.7	1.1	0.0	Fog-Rain-Snow
09/26/07	5.6	2.2	-1.1	Rain-Thunderstorm
09/27/07	8.9	4.4	0.0	
09/28/07	6.7	5.6	5.0	
09/29/07	5.6	5.6	0.0	
09/30/07	6.7	5.6	0.6	
10/01/07	2.8	0.0	-2.2	Rain
10/02/07	1.7	1.1	0.0	Fog-Rain
10/03/07	-1.1	-2.8	-4.4	Snow
10/04/07	3.9	-1.1	-6.1	
10/05/07	-5.0	-6.1	-8.3	Snow
10/06/07	-6.1	-7.8	-9.4	
10/07/07	-6.1	-7.8	-9.4	Snow
10/08/07	-6.1	-7.8	-11.1	
10/09/07	-1.1	-7.2	-13.3	
10/10/07	-7.2	-11.1	-15.0	Snow
10/11/07	-12.2	-13.9	-14.4	
10/12/07				
10/13/07	-3.3	-7.2	-11.1	
10/14/07	-2.2	-4.4	-6.1	Snow
10/15/07	-5.0	-6.1	-8.3	

Table 2. Temperature data from the Healy airstrip (PAHV) for spring 2008.

Healy - PAHV Airstrip Weather Data

AKDT	Temperature (°C)			Precip.
	Max	Mean	Min	Events
03/15/08	-4.4	-5.6	-6.1	
03/16/08	-7.2	-11.1	-15.0	
03/17/08	-14.4	-17.2	-20.0	
03/18/08	-17.2	-21.1	-25.0	Snow
03/19/08	-17.8	-22.2	-25.0	Snow
03/20/08	-10.0	-13.3	-18.9	
03/21/08	-10.0	-16.7	-22.8	
03/22/08	-9.4	-17.2	-25.0	
03/23/08	-10.0	-13.9	-17.8	Snow
03/24/08	-4.4	-10.0	-16.1	
03/25/08	-6.1	-13.3	-20.6	
03/26/08	-7.2	-13.3	-20.0	
03/27/08	-6.1	-12.2	-17.8	
03/28/08	-4.4	-11.1	-17.2	
03/29/08	-1.1	-6.1	-11.1	
03/30/08	0.0	-1.7	-3.3	
03/31/08	2.8	1.1	0.0	
04/01/08	5.6	4.4	2.8	
04/02/08	5.0	3.3	1.7	
04/03/08	2.8	1.7	1.7	
04/04/08				
04/05/08				
04/06/08				
04/07/08				
04/08/08	-2.2	-2.8	-6.1	
04/09/08	-3.3	-8.3	-13.3	Snow
04/10/08	-6.1	-7.8	-10.0	Snow
04/11/08	-6.1	-10.0	-14.4	Snow
04/12/08	-6.1	-12.2	-17.8	Snow
04/13/08	-5.0	-11.1	-11.1	
04/14/08	-1.1	-2.8	-5.0	Snow
04/15/08	-8.3	-10.0	-11.1	Snow
04/16/08	-11.1	-14.4	-17.2	Snow
04/17/08	-4.4	-7.8	-11.1	Snow
04/18/08	0.6	-2.2	-5.0	
04/19/08	6.7	2.2	-2.2	
04/20/08	10.0	5.6	1.7	
04/21/08	12.8	8.3	3.9	
04/22/08	1.7	0.0	0.0	
04/23/08	13.9	12.2	6.7	
04/24/08	8.9	5.6	0.6	Snow
04/25/08	-4.4	-5.6	-7.2	Snow
04/26/08	-3.3			Snow
04/27/08	3.9	-0.6	-5.0	
04/28/08	0.6	0.0	-1.1	Snow
04/29/08	1.7	-1.1	-3.3	
04/30/08	0.6	-1.7	-3.3	Snow
05/01/08	5.0	4.4	2.8	

There is also a place to record the first day of (near) **continuous** > 0°C temperatures in each category (solid red boxes). In this case, there are a few < 0°C days after the ~4/18/08, but this minor cooling period only slows the melting process but do not reverse it.

In the spring, it is possible for ice to be stranded above the water level after the main water body as completely melted out. This occurs when ice is either stranded on a gravel bar, beach or high point in the river or lake bottom or when thick ice (aufeis) mains attached to the river or lake bank. Please note that only the ice cover in the river channel or in the body of the lake is being estimated. When these are clear of ice the ice cover is 0%.

2. Submit your data to GLOBE as you acquire it. Remember other schools may be comparing their freeze-up and/or break-up with yours in real time.

Ice Seasonality Investigation

Annual Summary Data Sheet – *Example*

(see the Annual Summary Guide for the temperature data)

School Name: **Tri-Valley School** Study Site: ICE- **01**

Observer Names: **M. Martin and his class**

Period of Observation (YYMMDD): **071005** to **080517**

Ice Seasonality Milestones:

FREEZE-UP	**Date observed** (format: *YYMMDD*)
Date of first* minimum air temperature < 0°C:	**070917 (met. data)**
Date of continuous** minimum air temperature < 0°C	**071003 (met. data)**
Date of first mean daily air temperature < 0°C:	**071003 (met. data)**
Date of continuous mean daily air temperature < 0°C:	**071003 (met. data)**
Date of first maximum air temperature < 0°C:	**071003 (met. data)**
Date of continuous first maximum air temperature < 0°C:	**071005 (met. data)**
Date of first snow:	**070925 (observation)**
Date of continuous snow on the ground:	**070925 (observation)**
Date of first appearance of ice on the site:	**071006 (observation)**
Date of 100% ice cover on the site:	**080101 (observation)**
BREAK-UP	
Date of first maximum air temperature > 0°C:	**080331 (met. data)**
Date of continuous maximum air temperature > 0°C:	**080418 (met. data)**
Date of first mean daily air temperature > 0°C:	**080331 (met. data)**
Date of continuous mean daily air temperature > 0°C:	**080419 (met. data)**
Date of first minimum air temperature > 0°C:	**080401 (met. data)**
Date of continuous minimum air temperature > 0°C:	**080420 (met. data)**
Date of complete disappearance of snow on the ice:	**080502 (observation)**
Date of 0% ice cover on the site:	**080517 (observation)**

** first day when this phenomenon occurs*
*** first day this phenomenon becomes continuous (may be same as *)*

See the **Annual Summary Guide** for a complete description of how to determine milestone dates.